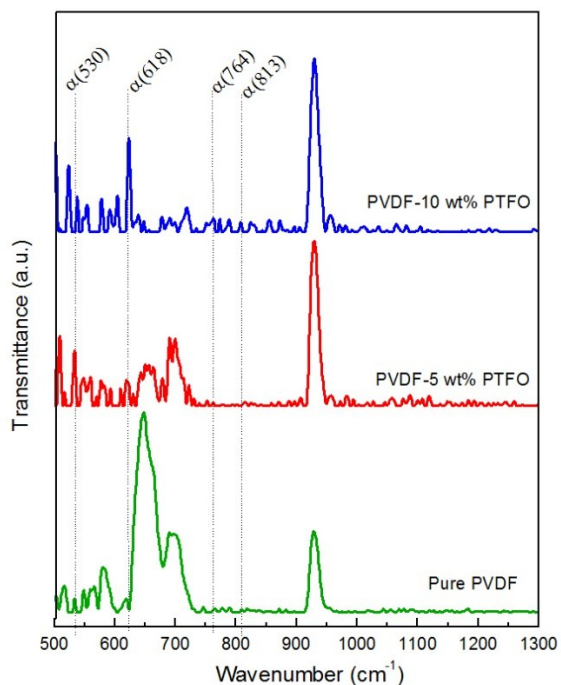


Supplementary Information

Fourier Transform Infrared Spectroscopy was used to investigate the phase transformation in PVDF samples. The supplementary Figure 1 shows the FTIR spectra of pure PVDF and PVDF/PTFO nanocomposite samples of 5 wt% PTFO and 10 wt% PTFO. The characteristic peaks at 530, 618, 764 and 813 cm^{-1} is a clear indication that pure PVDF as well as PVDF/PTFO nanocomposites crystallize predominantly in the α -phase. It is also observed that the addition of PTFO tends to increase the intensity of the peaks corresponding to the α -phase.



Supplementary Figure 1: FTIR analysis of pure PVDF and PVDF/PTFO nanocomposite film prepared via compression molding technique.

Supplementary Table 1: The influence of PTFO nanoparticles on PVDF matrix on the various investigated for PVDF/PTFO nanocomposite

Parameters	PVDF/PTFO Nanocomposites			
	0 wt%	5 wt%	10 wt%	25 wt%
ϵ' (1kHz)	9.7	9.8	9.7	12
Tan δ (1kHz)	0.0153	0.01182	0.01181	0.01098
M_s [(at 15 kOe) emu/g]	-	0.03	0.04	0.2
M_r (emu/g)	-	0.01	0.02	0.08
H_c (kOe)	-	2.83	3.16	2.68
P_m ($\mu\text{C}/\text{cm}^2$)	0.03	0.04	0.07	0.1
P_r ($\mu\text{C}/\text{cm}^2$)	0.01	0.02	0.023	0.026
H_c (Kv/cm)	3.26	16.12	17.9	21.22
MD %	-	0.24	0.26	0.3
σ_{dc} (S/cm)	6.07E-12	6.03E-12	6.28E-12	7.68E-12
η	0.96904	0.97069	0.97023	0.96983

Supplementary Table 2: Summary of the various experimental results for pure PVDF and PVDF/PTFO nanocomposite of 25 wt% PTFO nanoparticles investigated in this work along with the relevant reported results available in the literature.

Nanocomposite site films	PVDF/ PTFO (this work)		Ba _{0.95} Ca _{0.05} Zr _{0.15} Ti _{0.85} O ₃ /PVDF (36)			BaTiO ₃ : PVDF (37)	BaTiO ₃ /PVDF (38)	PVAc/BiFeO ₃ (22)	BiFeO ₃ / PVDF (19)	PVD F/BiFeO ₃ (20)	BiFeO ₃ /PMM A (21)	BiFeO ₃ /PVA (23)	Fe ₃ O ₄ / PVDF (39)	PVDF-GO-Fe ₃ O ₄ (40)	Ni /PVDF (41)
Preparation method	Hot molding		Solution Casting			Hot roll	Hot press	Soln. Cast.	Hot pres	Hot mold	Soln. Cast.	Soln. Cast.	Solv. Cast.	Solv. Cast.	Solv. Cast.
Filler content	0 wt%	25 wt%	neat PVDF	22 vol% BCZT	22 vol% dopamine @ BCZT	80 vol% BaTiO ₃	80%	2wt% PureBi FeO ₃	50 wt% BiFeO ₃	22 vol%	10 vol%	BiFeO ₃ /PV; 1/16	9.09% Fe ₃ O ₄	5wt% GO, 5wt% Fe ₂ O ₃	
ε' (1kHz)	9.7	12	~4	~7	~9.5	-	70	~7.5	-	500	~8.5	-	-	~7.5	-
tanδ (1kHz)	0.015	0.0109	~0.06	~0.06	~0.07	-	~0.05	~2.2	-	~0.2	~0.05	-	-	~0.1	-
Ms [(@ 15 kOe) emu/g	-	0.2	-	-	-	-	-	M _{max} ~0.4*	M _{max} ~0.02 [#]	-	~0.6* emu/cc	~0.5	~3.8	~2.2	~2.2
Mr (emu/g) ^Δ	-	0.08	-	-	-	-	-	-	~3.0 × 10 ⁻³	-	-	-	-	-	-
Hc (kOe) ^Δ	-	2.6	-	-	-	-	-	-	~1.2	-	-	-	-	-	-
Pm (μC/cm ²)	0.03	0.1	-	-	-	0.51@ 67.6 kV/cm	~0.8 @ 60 kV/cm	~4.5 at 20kV/cm	-	~60	-	~0.04x10 ⁻³	~0.04 @100 kV/cm	~0.05 at60 kV/cm	~0.1
Pr (μC/cm ²)	0.01	0.026	-	-	-	0.15	~0.2	~3	-	~20	-	~0.02x10 ⁻³	~0.02	~0.02	-
Hc (kV/cm)	3.26	21.22	-	-	-	19.2	~15kV/cm	~15KV/cm	-	~200	-	0.2kV/cm	~50kV/cm	~22kV/cm	-
MD % @9kOe	-	0.3	-	-	-	-	-	<0.10	-	-	-	-	~0.1	~0.02	~0.005
σ _{AC} (S/cm) @ 1kHz	~5x10 ⁻⁹	~7x10 ⁻⁹	-	-	-	-	-	-	-	~2x10 ⁻⁸	~2x10 ⁻¹⁰	-	-	-	-

*samples were superparamagnetic.

samples showed no saturation.

Δ Mr and Hc being so small that it can't be extracted from reported plots.